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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,238	12/22/2003	Paul Mattackal Verghese	0005.1120US1	6972
25263	7590	02/16/2005		
J GRANT HOUSTON AXSUN TECHNOLOGIES INC 1 FORTUNE DRIVE BILLERICA, MA 01821			EXAMINER CHANG, AUDREY Y	
			ART UNIT 2872	PAPER NUMBER

DATE MAILED: 02/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

(6)

Office Action Summary	Application No.	Applicant(s)	
	10/743,238	VERGHESE, PAUL MATTACKAL	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/22/2004</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the feature concerning “an optical port *through* the substrate of at least one of the first membrane device” recited in **claim 8** must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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3. Claims 1-2, 4-6 and 9 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Claim 1 and its dependent claims recite a Fabry-Perot **tunable** filter having two mirror structures for defining the cavity wherein *a tuning device* for *adjusting the cavity size* or the distance between the two mirror structures are **critical** or **essential** to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). A Fabry-Perot cavity cannot be **tunable** by simply having two mirror structures that defining a cavity there between.

Claim Objections

4. Claims 4, 8 and 10 are objected to because of the following informalities:

(1). The phrase “the first membrane device and the second membrane device are flat mirrors” recited in claim 4 is confusing since it is not clear how do there flat mirrors relate the first and second mirror structures recited in its based claim. It is believed that the first and second mirror structures are of flat mirror not the membranes.

(2). The phrase “an optical port through the substrate of at least one of the first membrane device and the second membrane device” recited in claim 8 is confusing and indefinite since it is not clear what is considered to be the “optical port *through* the substrate”.

(3). The phrase “a voltage between the substrates of the membranes” is confusing and indefinite since the term “substrates” lacks proper antecedent basis from its based claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 3-4 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by the patent issued to Russell et al (PN. 6,382,953).

Russell et al teaches a *Fabry Perot single cavity tunable filter* that is comprised of an *upper transparent layer* (22, Figures 2A and 3) serves as the *first membrane device* having a *membrane* for holding a *first mirror structure* (28) and a *lower transparent layer* (24) serves as the *second membrane device* having a *second membrane* holding a *second mirror structure* (30), wherein the second mirror structure is opposing the first mirror structure for defining a Fabry-Perot cavity (36) between the two mirror structures.

With regard to claims 3 and 11, Russell et al teaches that first and second membranes comprises electrostatic cavities (32, 34 and voltage source 48) for deflecting the first and second membranes by establishing a drive voltages between the first and second membranes. With regard to claim 4, the mirror structures held by the first and second membranes are of flat mirrors.

This reference has therefore anticipated the claims.

7. Claims 1-2 are rejected under 35 U.S.C. 102(e) as being anticipated by the patent issued to Waters et al (PN. 6,763,718).

Waters et al teaches a *tunable Fabry Perot interferometer cavity* that is comprised of a *wafer* (42, Figure 9) serves as the *first membrane device* having a *membrane* for holding an *upper mirror* serves as the *first mirror structure* and a *second wafer* (44) serves as the *second membrane device* having a *second*

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membrane holding a *lower mirror* serves as the *second mirror structure*, wherein the second mirror structure is opposing the first mirror structure for defining a Fabry-Perot cavity between the two mirror structures, (please see Figure 9 and column 6, lines 22-40). With regard to claim 2, a *spacer* is placed between the first and the second wafer or membrane devices for controlling a size of the Fabry-Perot cavity.

This reference has therefore anticipated the claims.

8. Claims 1, 5 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by the patent issued to Tayebati et al (PN. 6,438,149).

Tayebati et al teaches a *tunable single cavity Fabry Perot filter* that is comprised of a *top mirror support* (36, Figure 1) serves as the *first membrane device* having a membrane (37) for holding a *distributed Bragg reflector* (12) serves as the *first mirror structure* and a *substrate* (24) serves as the *second membrane device* having a *second membrane* holding a *distributed Bragg reflector* (10) serves as the *second mirror structure*, wherein the second mirror structure is opposing the first mirror structure for defining a Fabry-Perot *cavity* (8) between the two mirror structures, (please see Figures 1, 3F and 4G and columns 3, 6 and 9). With regard to claim 5, Tayebati et al teaches that one of the Bragg reflectors or the mirror structures (12) is *curved* with finite curvature, (please see Figure 1, column 6, lines 11-16). With regard to claim 9, Tayebati et al teaches that the mirror structures are distributed Bragg reflectors that comprise *dielectric* reflectors, (please see column 10, lines 65-67).

This reference has therefore anticipated the claims.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Russell et al in view of the patent issued to Fein et al (PN. 3,498,693, the true Author should be Markin Joseph et al).

The Fabry Perot single cavity tunable filter taught by **Russell et al** as described for claim 1 above has met all the limitations of the claim with the exception that it does not teach explicitly that both of the first and second mirror structures are curved mirrors. **Fein et al** in the same field of endeavor teaches a cavity formed by two opposing reflector wherein the opposing reflectors are curved for eliminating unwanted spread of the light due to diffraction when undergoes multiple reflections between the two reflectors, (please see Figure 8, column 6, lines 69-75). It would then have been obvious to one skilled in the art to modify the first and second mirror structures of **Russell et al** to make them of curved mirrors for the benefit of reducing unwanted diffraction occurs between the light reflected off the two mirror structures to make the tunable filter more accurately operated.

11. Claims 7-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Russell et al.

The Fabry Perot single cavity tunable filter taught by **Russell et al** as described for claim 1 above has met all the limitations of the claims. **Russell et al** teaches that an electrostatic drive voltage is set up between the *two membrane devices* for holding the two mirror structures to cause the cavity size being adjusted therefore tuning the Fabry-Perot tunable filter. However this reference does not teach explicitly that the membrane device comprises a substrate and the membranes are being deflected by establishing drive voltage between the membrane and the substrate. However the essential requirement for the Fabry

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Perot tunable filter to be tunable is for the size of the cavity which defined by the separation distance between the two opposing mirror *structures*, to be adjustable by the drive voltage, whether to make the size variation by having the mirror structures moved *with* the substrate (as disclosed by Russell et al) or *with respect to* the substrate are really obvious modifications to one skilled in the art, (since it only involves modifications of placing the electrodes at different places). One skilled in the art would be motivated to make the first and second mirror structures movable with respect to the substrates for the benefit of allowing the substrates being parts of the application system intends to utilize the Fabry-Perot tunable filter (therefore save money to have extra parts) and just moved the mirror structures themselves to achieve the same tunable filtering function and without the need of moving the whole substrate and therefore requires less amount of electrostatic force needed for the tuning. With regard to claim 8, Russell et al teaches that a spectral layer (38 and 40, Figure 3) may be used to couple the incident and outgoing light (42 and 48) to enter and exit the Fabry-Perot tunable filter, these spectral layers can be identified as the optical ports through the substrates, (wherein the parts of the transparent layers 22 and 24 in contact with the spectral layers can be defined as the substrates).

Contact Information

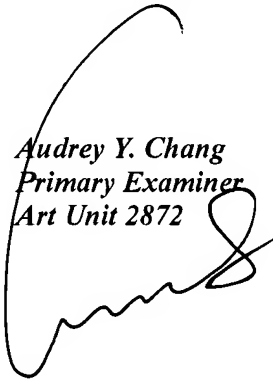
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Audrey Y. Chang
Primary Examiner
Art Unit 2872



A. Chang, Ph.D.